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Heterotrophic calcification of medial collateral ligament of knee joint: a case report

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Abstract

Soft-tissue calcification is characterised by the deposit of calcium in the damaged collagen fibres. The pathology of the phenomenon is not fully known. Trauma, spinal cord injury and traumatic brain injury have been reported as possible risk factors. Hypertrophic calcification of medial collateral ligament can be post-traumatic with unexplained aetiology. It can restrict the normal range of joint motion, affecting performance of activities of daily living, resulting in disturbance of quality of life. It may be managed conservatively, but if unsuccessful, surgical removal of the calcification may be carried out. Here, we present a case of post-traumatic heterotrophic calcification of medial collateral ligament of knee joint and review of current literature.

Keywords: Heterotrophic calcification, Lower extremity functional scale, medial collateral ligament, Physiotherapy.

Introduction

Soft-tissue calcification results due to heavy deposits of calcium within or between the collagen fibres. The most common site of calcification is upper quadrant,

particularly involving rotator cuff tendon, which is seen in one out of every five healthy individuals. The causes include humoral factors, local factors, including hypercalcaemia and hypoxia, neural factors, variation in sympathetic nervous activity, prolonged period of immobilisation and mobilisation with frequent exercise bouts after long-term immobilisation. These causes are not only responsible for the development of Pellegrini-Stieda Syndrome (PSS) but also trigger neurogenic ectopic bone formation and calcification. PSS usually presents with history of trauma and recurrent micro traumas.[1] Calcification of the femoral origin of the medial collateral ligament (MCL) of the knee is called Pellegrini–Stieda lesion. Post-traumatic ossification of the whole MCL rarely occurs and results in limitation of range of motion of the knee.[2] PSS should not only be considered during differential diagnosis of knee pain, swelling and limitation of range of motion, but also screened during assessment of patient for neurologic rehabilitation after traumatic brain injury.[3] Patients with history of traumatic brain injury, spinal cord injury and other upper motor neuron lesions can present with neurogenic heterotrophic ossification at major synovial joint which are surrounded by spastic muscle. Heterotrophic ossification (HO) can lead to the development of nerve impairment, joint ankyloses, osteoporosis and complex regional pain syndrome. The resultant decrease in ROM affects the patient's activities of daily living ultimately producing decline in quality of life.[4] Management of HO focuses on arresting its progress and minimising the effects of limitation on the functions of the joint. Non-surgical management is advisable for early HO; however, joint ankyloses and significant limitation of ROM needs surgical excision.[5] Previously, radiological and clinical presentation of true heterotopic bone in patients with paralysis has been confused with trauma, neoplasm, osteomyelitis and thrombophlebitis.[6] Heterotrophic calcification is an uncommon case encountered in orthopaedic departments.[7] Total knee arthroplasty may result in ankylosis due to calcification of collateral ligaments and intra articular bone

formation.[8] The Lower Limb Function Scale LEFS is preferred against SF-36 questionnaire for the documentation of physical functions in patients with lower extremity dysfunctions in terms of clinical efficiency and sensitivity.[9]

Case Report

A 14-year-old boy had a road accident while driving a motorbike, injuring his left lower extremity. He was taken to the trauma centre of a public hospital. Emergency medical care was provided that included stitching of the wound and a back slab, after which the patient was discharged. After a couple of days, in the last week of May 2019, an orthopaedic surgeon was consulted for further treatment at Amin Welfare & Teaching Hospital, Sialkot. Detailed examination and necessary investigations were carried out. There was massive swelling around the knee joint. As the swelling settled, plaster was applied for eight weeks. Valgus stress test was positive. Radiographic examination of the knee joint revealed an abnormal bone-like structure on the medial aspect of the knee connecting both the femoral and tibial medial condyles (Figure 1). An MRI scan without contrast was performed to confirm the diagnosis, which revealed heterotrophic calcification in the lower part of the medial collateral ligament at the tibial attachment site along with moderate partial thickness tear of the medial collateral ligament. There was limited range of motion of the affected knee along with pain and difficulty in bearing weight on the left limb. He was referred to the physiotherapy department. Consent form was signed by the father of the boy. Detailed examination was carried out by a competent physical therapist. There was only 5° active flexion and 10° passive flexion on the knee joint. There was a hard bony end feel at the limit of passive flexion range of motion (ROM). This limitation was affecting all his activities of daily living (ADL). His Lower Extremity Function Scale (LEFS) score was 10/80 at the baseline.

His treatment plan was designed to regain Flexion ROM of the knee, relief pain, subside swelling and restore ADLs, ultimately improving his quality of life (QOL). The treatment included TENS, ultrasonic therapy, wax therapy, relaxation massage, passive mobilisation techniques including Kaltenborn Grade-III posterior glide to medial aspect of upper end of tibia in accordance with concave rule, and patellar caudal and lateral glides, Hold Relax (PNF) technique, stretching of tight (quadriceps) muscles, strengthening exercises of the weak (Hamstrings) muscles. Partial weight bearing using crutches was incorporated to improve the gait. Physiotherapy was administered thrice a week for six weeks. After six weeks, knee flexion was 120° and knee extension from flexed position was 0°, end feel was firm and ADLs could be performed with relative ease. There was appreciable improvement in the LEFS score (57/80). A comprehensive home programme was prescribed and follow up comprising re-assessment and treatment including manual mobilisation techniques, stretching of tightened muscles and strengthening exercises of the weak muscles was carried out for six weeks.

Discussion

Our study supports the findings of Gocken N et al who proposed that heavy exercise immediately after long period of immobilisation augments PSS.[1] Mendes LF et al proved that ossification in PS disease is not confined to MCL but may also involve the adductor magnus tendon.[10] Bossche LV, Vanderstraeten G reviewed if radiation therapy was useful in prevention and treatment of hetrotropic ossification.[11] This study is in contradiction with the treatment of ossified MCL reported by Mohamed AR et al[2] Our study supports the results of another case report by Muschol M, et al who reported that pathologic calcifications not only involves rotator cuff tendon but also affects other structures of the locomotor system. Initially they treated all patients conservatively by needling and local anaesthetic. Surgical removal of the deposit was

considered only after poor results of conservative treatment. Pain immediately subsided after open resection.[12]

Conclusion

Any trauma followed by knee immobilisation can result in Heterotrophic calcification of medial collateral ligament of knee. If diagnosed early, it can be managed with physical therapy.

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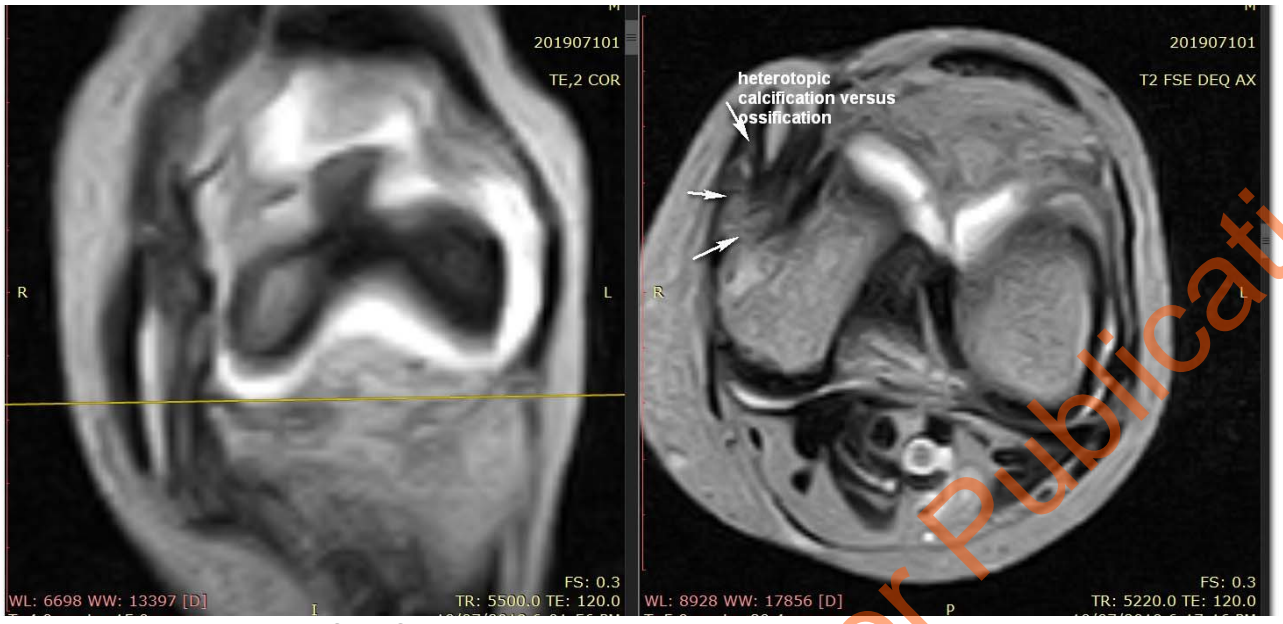

Figure 1: MR Scan of Left Knee joint